

## SECTION 4000. DESIGN STANDARDS

### 4100. STREETS.

#### 1. Non-residential Subdivisions

General criteria for non-residential subdivisions can be found in Section 9 of the Town's Zoning By-laws.

#### 2. Residential Subdivisions

General Criteria: The number of home sites used to determine the appropriate width of traffic lanes and sidewalks/bikepaths shall be based upon the number of potential home sites serviced by the proposed road.

	<u>Local Street</u>	<u>Secondary Street</u>	<u>Sidewalk</u> (on one side)
Right of Way	50 feet	60 feet	
Traffic Lanes			
1-10 home sites	2 9 foot lanes	2 12 foot lanes	not required
11-20 home site	2 10 foot lanes	2 12 foot lanes	required
21-30 home sites	2 11 foot lanes	2 12 foot lanes	required
over 31 home sites	2 12 foot lanes	2 12 foot lanes	required
Paved Shoulders	none	2 6 foot shoulders	
Park Strips (min)	2 5 foot strips	2 6 foot strips	
Sidewalks/Bike Path	1 6 foot path	1 8 foot path	
Utility Strips (at sides of pavement)	2 1 foot strips	2 1 foot strips	
Maximum Gradient	8-40 percent	8-40 percent	
Minimum Horizontal Center Line Radius	200 feet	400 feet	

#### Notes:

- Greater width may be required by the board where necessary to meet present or future traffic demands.
- Minimum gradient of any street shall be one (1) foot in one hundred (100) feet.
- Efforts shall be made to minimize the gradient of street by locating streets so that

- they follow contours rather than crossing contours. The gradient shall never exceed ten (10) percent.
- d. Sidewalks and/or bicycle paths and curbs will be required only in areas of the Town where the Planning Board determines them to be necessary for public safety. Bike paths at the discretion of the Planning board may be created by delineating a special lane on a paved way. "The centerline grade of the proposed road at any point shall be not more than five (5) feet above or below the existing centerline grade."
  - e. Cut or fill side slopes shall not be steeper than 3:1.
  - f. All above-grade features, such as hydrants, utility poles, etc., shall be confined to the utility strip adjacent to the property line and are not to be placed in the park or green strip, no greater than forty (40) feet on center of both sides of the street.
  - g. The number of curb cuts into the streets should be minimized by the use of common driveways serving more than one (1) lot. Such common driveways shall have at least a ten (10) foot width of traveled way with suitable additional spaces provided for vehicles to be parked on each lot without blocking the common driveway.
  - h. All utilities shall be underground. Cable TV shall be included.
  - i. "A one hundred (100) foot long leveling areas shall be provided at all intersections. The leveling area will have maximum slope of three percent (3%)."
  - j. Guard rails shall be installed where slopes from the right of way exceed 1:4 and the slope exceed 5 feet in height, or where required by the Board to protect vehicles from obstructions or to maintain public safety.
  - k. Where changes in roadway grade exceed one percent (1%), vertical curves shall be provided.
  - l.

#### 4200. MISCELLANEOUS STANDARDS

- a. All streets in the subdivision shall be designed so that in the opinion of the Board, they will provide safe vehicular travel.
- b. The proposed streets shall conform to the Master or Study Plan of the Town adopted in whole or in part by the Board.
- c. All dead end streets shall have a paved turning circle of one hundred-eight (108) feet in diameter and a property line diameter of one hundred-twenty (120) feet with curb radii of not less than thirty feet (30) at the entrance. The center of the circle shall be planted in low growing vegetative cover. The width of the paved portion shall equal one and one-half (1.5) times the width of the traffic lane of the straight portion of the street.
- d. Street jogs with centerline offsets of less than one hundred twenty-five (125) feet shall be avoided.
- e. Curves at intersecting streets shall have a tangent distance of not less than twenty (20) feet.
- f. All reverse curves on secondary streets shall have a minimum tangent between curves of one hundred (100) feet.
- g. Streets shall be laid out so as to intersect as nearly as possible at right angles. No street shall intersect any other street at less than seventy (70) degrees.
- h. Property lines at street intersections shall be rounded to cut back to provide for a

- curb radius of not less than twenty (20) feet.
- i. All roads shall be built such that the bottom of the gravel base lies above the probable maximum high ground water.
- j. Roads not yet released by the Planning Board from performance guarantee shall be maintained to standards acceptable to the Planning Board. Potholes in these roads must be repaired within two (2) months of their report to the Planning Board (from April 1 to November 1).
- k. No land may be stripped of all vegetation and left as bare soil without approved erosion control.
- l. A twenty-five (25) foot no disturbance vegetation buffer be maintained around wetlands, streams, ponds and vernal pools.
- m. No dead end street shall exceed 500 feet in length.
- n. Center –line offsets for intersecting streets shall not be less than two hundred (200) feet.
- o. In all cases, the center-line of the paved surface shall be coincidental with the center-line of the right-of way, unless specifically excepted by the Board.
- p. Sight distance requirements at intersections shall conform to the requirements of the MHD Design Manual and shall be determined in accordance with AASHTO procedures utilizing a 3.5 foot height observer and a 0.5 foot object.
- q. The roadway pavement shall consist of a four (4) inch thickness, after compaction, of Class 1Type 1-1 plant mixed bituminous concrete, composed of materials and prepared and installed in conformity with Section 460 of the Massachusetts Department of Public works Standard Specifications(hereafter referred to as MDPW Standard Specifications). The pavement shall be spread and rolled in two courses: a tow and one half (2 ½) inch thickness standard base course and a one and one half (1 ½) inch thickness top course, in conformity with the Specifications aforementioned.

#### 4300. EASEMENTS.

1. Easements for utilities across lots shall be provided where necessary but, where practicable, shall be centered along rear or side lot lines and shall be at least twenty-five (25) feet wide.
2. Where a subdivision is traversed by a watercourse, drainage way, channel or stream, easements as required to meet the Conservation Commission's Order of Conditions shall be provided.
3. See Section 3330.f, "Common Land and Ways", for easements covering common driveways.
4. A separate, numbered lot, upon which a detention/retention pond(s) is located and all easements on the other lots which are pertinent to said detention/retention pond(s) themselves, shall be held by a legal entity to be formed by the applicant-owner for the benefit of owners of lots within the subdivision. The documents describing the above legal entity, which shall hold the lots and easements, shall be reviewed by the Town Counsel and shall be subject to his or her approval . The applicant-owner shall execute such legal documents as are required to effectuate the conveyances above described. Maintenance of the detention/retention

pond(s), including periodic dredging, shall be a responsibility incorporated in the above described document.

#### 4400. OPEN SPACES AND PROTECTION OF NATURAL RESOURCES

Before approval of a plan, the Board shall also, in proper cases and in conformance with the most recently adopted Master Plan and Open Space Plan, require the plan to show a park or parks suitably located for recreational purposes. The park or parks shall not be unreasonable in area in relation to the land being subdivided and to the prospective uses of the Land. The park shall be located on a separate lot under common ownership and shall be labeled as non-buildable.

No change shall be made in the contour of the land that adversely affects the land abutting the proposed subdivision.

All possible steps shall be taken to preserve all natural features, such as, but not limited to, desirable and mature trees and shrubs, water courses, scenic views and vistas, open space, historic spots, the habitat of species listed as rare, endangered, or of special concern by the Massachusetts Department of Fisheries, Wildlife and Environmental Law Enforcement, Natural Heritage and endangered Species Program, and similar community assets, which if preserved, will add attractiveness and value to the subdivision. It is the intent of the Planning Board with these provisions to preserve any especially large or unusual species of plants. Property within any Overlay District must meet the requirements of these District.

#### 4500. FLOOD PROTECTION

Within the floodplain area of the one hundred (100) year flood as shown on the map entitled "Flood Insurance Rate Map (FIRM), town of Marion, revised February 17, 1988" or more recent updates hereby made part of these regulations and on file at the office of the Town Clerk, the following requirements shall apply:

1. All subdivision proposals shall be consistent with the need to minimize flood damage.
2. All public utilities and facilities shall be located and constructed to minimize or eliminate flood damage. All utilities shall be flood proofed so as to prevent short-circuiting of electrical conduits, contamination of water supply by floodwater or contamination of water by sewage or other infiltration.
3. All roads built in the velocity zone shall be permeable and shall have a second means of egress that shall not lie within a velocity zone.
4. Lots shall be of sufficient area and of such shape and location so that anticipated new structures will be able to be safely sited within areas of each lot so that the

lowest floor (including basement) is elevated to above the level of the one hundred (100) year flood.

5. Detail proposed grading and drainage shall be provided for all lots located in floodplain areas to ensure that flood protection is maintained and that flood damage is not increased in adjacent existing and proposed lots.
6. All public utilities and facilities shall be located, elevated and constructed to minimize or eliminate flood damage.

#### 4600. STORM WATER MANAGEMENT

1. The design of the system for storm water management for each development shall accomplish the following:
  - a. reproduce, as nearly as possible, the hydrological conditions in the ground and surface waters prior to development as indicated in Item 2 below.
  - b. Reduce storm water pollution to the maximum extent possible using best management practices as indicated in Item 3 below.
  - c. Have an acceptable future maintenance plan covering method and execution.
  - d. Have a beneficial effect of the natural and human environment.
  - e. Be appropriate for the site, given physical constraints.
  - f. Provide a sufficient level of health and environmental protection during the construction phase.
  - g. The design and construction of each subdivision shall be done in a manner so as to prevent increase flooding and to minimize the discharge of pollutants. Storm water shall be properly managed prior to the discharge of such runoff into the existing storm drainage system or wetland resource areas listed in the Wetland Protection Act Regulations, 310 CMR 10.000.

2. The design and construction of each subdivision shall be done in a manner such that post construction runoff will not exacerbate or create flooding conditions, or alter surface water flow paths such as to impact adjacent properties to the site during the 2, 10, 25 and 100-year 24 hour storm event. No increase will be allowed in the peak rate of runoff for any of the above design storms. The total volume of post-development runoff shall not exceed the pre-development runoff for the ten (10) year, 24 hour design storm.

3. The “first flush” of the storm water shall be treated prior to discharge. The treatment system(s) shall be designed to accommodate the runoff from the first flush of the entire subdivision area. Treatment shall be provided to achieve eighty (80%) percent removal of total suspended solids for the “first flush”. In addition, any development in the Sippican Harbor and Wings Cove watersheds shall incorporate physical treatment processes to remove nitrogen at a minimum efficiency rate of 30%. Development in the Mary’s Pond water shed shall incorporate phosphorous removal at a minimum design rate of fifty (50%) percent.

4. The applicant shall be responsible for complying with Marion Board of Health and

Conservation Committee regulations governing the pertinent aspects of the storm water management system.

5. After the drainage system has been constructed and before the Performance Guarantee for the development is released, the applicant shall submit as "As-Built" plan detailing the actual drainage system as installed. The consulting engineer or the Superintendent of the DPW, acting as the agent for the Planning Board, shall inspect the system to confirm its As-Built features. The engineer shall also evaluate the effectiveness of the system in an actual storm. If the system is found to be inadequate by virtue of physical evidence of operational failure, even though it was built as called for in the Definitive Plan, it shall be corrected before the Performance Guarantee is released. Examples of inadequacy shall be limited to: errors in the infiltrative capability, errors in the maximum ground water elevation, failure to properly define or construct flow paths, or erosive discharges from basins.
6. Easements and provisions for vehicular access shall be provided along the entire length of storm drain lines.
7. The system of storm water drain lines installed shall be capable of conveying the twenty-five (25) year storm, including manholes, and outlets. Catch basins and culverts shall be capable of handling the one hundred (100) year storm.
8. Water velocities in pipes and gutters shall be between two (2) and ten (10) cubic feet per second, respectively.. Water velocities in non-paved areas (e.g. swales, ditches) shall not be more than published values for "Maximum Permissible Velocities" based on surface cover type and soil types. In high volume conditions (greater than fifteen (15) cubic feet per second) the maximum design velocity shall not exceed eight (8) feet per second.
9. Catch basins shall be designed (inlet capacity and spacing) such that the flow in the gutter during a twenty-five(25) year design storm is not more than four feet in width as calculated utilizing methodologies described in "Drainage of Highway Pavements, Hydraulic engineering Circular No. 12" as published by the US Department of Transportation, Federal Highway Administration. In any event, water shall not be allowed to run for more than three hundred (300) feet on paved surfaces.
10. The standard depth of catch basins shall be two and one-half ( 2 ½) feet below the invert of the outlet. Catch basins shall not serve as manholes. Manholes shall be constructed at each junction point. Leaching basins, if permitted, shall be cross - connected in pairs.
11. Catch basins shall be located in pairs, one on each side of the roadway, at all low points or sag curves in the roadway, at intervals of not more than three hundred (300) feet on continuous grade of the roadway, at corners of the roadway at

intersecting streets and at cul-de-sacs.

12. When in the opinion of the Planning Board and confirmed by the reviewing independent Registered Professional Engineer that the existing street drainage and/or downstream drainage systems are inadequate, the applicant shall be responsible to upgrade said existing drainage system to accommodate the storm water flows from the proposed subdivision.
13. No more than four (4) pipe openings shall be allowed in any one (1) manhole. Four (4) foot inside diameter manholes will be used for drains up to thirty (30) inches in diameter. Five (5) foot inside diameter manholes are necessary for pipe diameter between thirty-six (36) and forty-eight (48) inches. All flows into a manhole angle between the main and any connecting line of ninety degrees (90 ). All connecting lines shall have bricked inverts rounded into the direction of flow.
14. Drain pipes shall be reinforced concrete, with bell and spigot gasketed joints. The pipe shall be Class III in accordance with ASTM C-76. The gaskets shall be O-ring type in accordance with ASTM C-443. The minimum diameter shall be twelve (12) inches. All drain pipe shall be installed with a minimum thirty (30) inches of cover.
15. Storm water management systems shall not be located on a lot available for any other use except as a common lot available for utilities or services. The applicant shall provide adequate means of security to insure the maintenance of the storm water system for a period of time not to exceed twenty (20) years.
16. At cross culverts, drainage easements shall be established up-gradient and delineated on the Definitive Plan based on the projected one hundred (100) year headwater elevation on the culvert.
17. Detention and infiltration basins may not be located within the VE Zone as depicted on the map entitled "Flood Insurance Rate Map, town of Marion, which is in effect at the time of application."
18. Use of retention basin to control stormwater runoff will not be allowed.
19. No detention or infiltration basin shall be deeper than three feet.

#### 4700. UTILITIES.

1. Gas, cable TV, and electric lines shall be installed to meet the standards of the respective utility companies.
2. All utilities shall be underground. Other portions of the utility systems that are constructed above ground shall be screened by evergreen shrubs.

3. The utility strip shall be located on the opposite side of the street from the sidewalk.
4. All utilities installed shall have a capacity judged by the Planning Board to meet future requirements.
5. Utilities shall be inspected upon installation, in accordance with Section 6100, and approved before continuing the project.
6. Where public sewers are required, the following design standards shall apply:
  - a. Public sewers shall be designed according to professional engineering practices and in accordance with the requirements of the standards of the Water Department
  - b. Public sewers shall be not less than eight (8) inches in diameter; house services not less than six (6) inches.
  - c. Manholes shall be located at every change in grade or horizontal alignment but not more than three hundred (300) feet apart.
7. Where public water service is required, the following design standards shall apply:
  - a. Public water mains shall be not less than eight-inch (8) diameter Class 52 cement-lined ductile-iron pipe with push-on gasket joints.
  - b. Connection to town water mains shall be the subdivider's responsibility but shall be made only under the direction of the Department of Public Work Superintendent. A water permit must be obtained from the Department of Public Works prior to tapping any main.
  - c. Water mains shall be laid in dry trenches on a twelve-inch (12) bed of sand or approved material. Construction pipe shall be manually tamped with sand the full length of the pipe up to one-half (1/2) the diameter of the pipe so as to eliminate any voids under the pipe.
  - d. Water mains shall be laid to provide a minimum cover of five (5) feet below the finished grade and a maximum of seven (7) feet.

#### 4800. STREET TREES

1. Suitable mature trees along the road should be kept where possible. Once the road has been completed, shade trees of at least two (2) inch caliper at Diameter Breast High (DBH) should be planted on average every forty (40) feet along each side of the road. Trees shall be located four (4) feet beyond the edge of the curbing and shall not interfere with existing or proposed sewer or utility connections. Shade trees meeting the approval of the Planning Board shall be planted.
2. In order to protect against the potential for all of the street trees in any subdivision to be lost to disease or insects, no more than one-third (1/3) of the trees planted



- shall be of the same species.
3. Trees planted shall have temporary labels so that inspectors can determine that the species shown on the plan have actually been planted. The applicant is responsible for assuring that all planted trees are alive at the time of final performance guarantee release. All trees should be alive one (1) year after planting.

#### 4900. FUTURE DEVELOPMENT

In determining the design standards to apply to any particular subdivision plan, the Board shall consider the potential for future development along or off the proposed ways. The extent of the potential for future development shall be based upon the existence of developable land contiguous with the subdivision property, and of dividable lots in the subdivision property, whether or not such development of division might constitute a subdivision; and shall also be based upon the topography of such land or lots, and the zoning provisions and other laws applicable to such land or lots which may affect its use. The Board shall apply to the particular subdivision plan those design standards that would be applied if the adjoining land or dividable lots were developed so as to maximize the burden imposed upon the ways, utilities, and services of the proposed subdivision. The Board may waive the requirements of this section only upon the undertaking of the applicant, by covenant or otherwise, to the satisfaction of the Board, which will prevent the imposition of an increased burden upon the subdivision by future development, and also upon a finding by the Board that such waiver is in the interest of the public health, safety and welfare.